salmonids

Table 1. Draft LWG Mitigation Framework^a - Active Channel Margin **Active Channel Margin** Covered Sloped structures over (<5:1), Sloped channel (>5:1), Sloped (>5:1) unarmored margins Sloped (<5:1), unarmored and unarmored Sloped Sloped (>5:1) (docks) Riprap Concrete Pilings (1 per (<5:1), biovegetated unarmored and and vegetated vegetated with Sloped (>5:1), narmored and (1/2 value ofor other artificial 100 sq ft) (1/2 invasives (0.1 unvegetated (native)^q (native)^q engineered^q Note debris Note Note Note Note bio-engineered unvegetated Note the margin value of margin Note $(0.6)^{0, q}$ ID (0.2 - 0.8) (0.4 - 1) $(0.2 - 0.8)^{q}$ ID (0.2 - 0.8) (0.2 - 0.8)(0.1 - 0.3)(0.1 - 0.3)ID ID ID ID ID ID ID ID Sheetpile (0) ID **Remedial Technologies** type) type) Dredging Dredging resulting in a habitat type conversion to deep water (0.1) d d e _ O Dredging **not** resulting in a habitat type conversion (may include capping back over the dredge area with similar substrate type) Capping Capping resulting in a **significant** change in substrate type (i.e., from d d e silt/sand/gravel to large rock) but no change in depth zones ⁿ Capping resulting in a **moderate** change in substrate type (i.e., from silt/sand/gravel to cobble or material size larger than gravel but smaller d k d d e than riprap) but no change in depth zones ⁿ Capping that **does not** result in a significant change in the substrate type (i.e., substrate size remains similar to existing conditions) and no change in depth zones Capping that leads to a conversion of deep water to shallow water depth zones and results in a significant change in substrate type (i.e., N/A from silt/sand/ gravel to large rock)ⁿ Capping that leads to a conversion of deep water to shallow water depths and <u>does not</u> result in a significant change in substrate type N/A (i.e., from silt/sand/gravel to large rock) ⁿ Shoreline Integration^b Shoreline integration resulting in hardening of the shoreline (i.e., e f, o placement of large rock) Shoreline integration resulting in softening of the shoreline g, o e Shoreline integration that **does not** result in a change in the shoreline **Enhanced Monitored Natural Recovery (includes in situ treatment)** Placement of sand/gravel or smaller substrate for monitored natural recovery Over-water and In-water Structures Removal of over-water structures that causes aquatic shading N/A Replacement of over-water structures in a way that reduces the amount of aquatic shading by allowing light to penetrate underneath the N/A structure and that is expected to improve habitat function Removal of existing piles that provide habitat to predators of juvenile

N/A

Page 1

Table 1 Draft I WG Mitigation Framework^a - Active Channel Margin

Table 1. Draft LWG Mitigation Framework" - Active Channel Margin																						
											Active Ch	annel M	largin									
	Sloped (<5:1), unarmored and vegetated (native) ^q	Note	Sloped (<5:1), unarmored and unvegetated		Sloped (>5:1), unarmored and vegetated (native) ^q	Note	Sloped (>5:1) unarmored and vegetated with invasives (0.1 -		Sloped (<5:1), bio-		Sloped (>5:1), bio-engineered		Sloped (>5:1) unarmored and unvegetated		Covered structures over channel margins (docks) (1/2 value of the margin		Riprap Concrete or other artificial debris	Note		Note	Pilings (1 per 100 sq ft) (1/2 value of margin	Note
Remedial Technologies	(0.4 - 1)	ID	$(0.2 - 0.8)^{q}$	ID	(0.2 - 0.8)	ID	0.6)°, q				(0.2 - 0.8)	ID	(0.1 - 0.3)	ID	type)	ID	(0.1 - 0.3)	ID	Sheetpile (0)	ID	type)	ID
Confined Disposal Facility Construction/Confined Aquatic Disposal																						·
Filling that leads to a conversion of deep water to shallower water depth zones and results in a significant change in substrate type (i.e., from silt/sand/ gravel to large rock) ⁿ	N/A	-	N/A	-	N/A	-	N/A		N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Filling that leads to a conversion of deep water to shallow water depths and does not result in a significant change in substrate type (i.e., from silt/sand/gravel to large rock) ⁿ	N/A	-	N/A	-	N/A	-	N/A		N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Filling aquatic habitat that results in a conversion to upland habitat		-		-		-		0		-		-		-		-		-		-		e

Notes:

- a This matrix is focused on long-term habitat impacts rather than short-term construction related impacts. The short-term construction related impacts would be dealt with using BMPs that could potentially be employed, and would not require habitat mitigation.
- b Shoreline Integration = To successfully integrate a new cap or dredge slope into the shoreline may need to be altered; the need for dredging and capping in the river may result in the need for integration into the higher shoreline for removal or capping of contaminants in the lower shoreline.
- d It is assumed that the existing habitat condition will not be further improved or degraded if left in place regardless of the proposed remedial activity. For example, sheetpile and riprap in the active channel margin have a habitat value of 0. The proposed habitat value will remain 0 regardless of what remedial activity is proposed.
- e Existing or proposed habitat values depend on the habitat characteristics where the piling or covering structures are or will be located.
- f Value could change depending on the type of hardening that occurs. For this table, we assumed the slope would be riprapped.
- g Value could change depending on proposed type of softening. For this table we assumed a slope < 5:1 with vegetation and no armoring.
- h No existing values are found in the NMFS Expert Panel Table of Relative Chinook Salmon Lower Willamette Habitat Values for hardening off-channel habitats, so the values from the active channel margin were used
- i It is assumed that the riprap and covering structures habitat will not be further improved or degraded by placing piling.
- k NMFS Expert Panel provided a value of 0.1 for riprap in the shallow water main channel areas. Proposing to add a value of ranging from 0.4 to 0.6 for material sized larger than gravel, but smaller than riprap.
- n Sand/silt/gravel = material less than 64 mm in size
- o This scenario did not have a value in the Expert Panel table.
- p Value will vary depending on what the naturally vegetated habitat types will be hardened to (i.e., vegetated riprap or riprap) or on what the degraded habitat types are softened to.
- q sand/gravel material overlying riprap (may need monitoring to confirm it remains in place) gets same values; Riprap with smaller material layered on top, or placed in such a way as to promote natural deposition of sediment would provide habitat value similar to those for given ACM categories

General Note - For the purposes of the FS, it is assumed that mitigation projects would be implemented within 2 years of the remedial activity and that it would take the habitat 1 year to reach full function.

Table 1. Draft LWG Mitigation Framework^a - Main Channel

Table 1. Draft LWG Mitigation Framework ^a - Main Channel					M	oin Chonn	el Shallow Wat					
					IVI	ain Chann	ei Shallow Wat	er	1			
Remedial Technologies	Gravel and finer substrates 0 to 10 ft water from OLW $(0.8 - 1)^q$	Note ID	Gravel and finer substrates 10 to 20 ft water from OLW $(0.4)^q$	Note ID	Natural rock outcrop (can not be created) 0 to 10 ft water from OLW (0.8 - 1)	Note ID	Natural rock outcrop (can not be created) 10 to 20 ft water from OLW (0.3)	Note ID	Moderate substrate size (rounded rock larger than sand/gravel but smaller than riprap) 0 to 10 ft water from OLW (0.4 - 0.6) ^q	Note ID	Moderate substrate size (rounded rock larger than sand/gravel but smaller than riprap) 10 to 20 ft water from OLW (0.2) ^q	Note ID
Dredging Remedial Technologies	(0.0 - 1)	Note ID	(0.4)	Note ID	(0.0 - 1)	Note ID	(0.3)	Note ID	(0.4 - 0.0)	Note ID	(0.2)	Note ID
Dredging resulting in a habitat type conversion to deep water		_		_	N/A	-	N/A	-	1	_		_
Dredging not resulting in a habitat type conversion (may include												
capping back over the dredge area with similar substrate type)		-		-	N/A	-	N/A	-		-		-
Capping			1									
Capping resulting in a significant change in substrate type (i.e., from												
silt/sand/gravel to large rock) but no change in depth zones ⁿ		-		-	N/A	-	N/A	-		-		-
Capping resulting in a moderate change in substrate type (i.e., from												
silt/sand/gravel to cobble or material size larger than gravel but		k		k	N/A	_	N/A	_		k		k
smaller than riprap) but no change in depth zones ⁿ					1,111		1 1/1 1					
Capping that does not result in a significant change in the substrate												
type (i.e., substrate size remains similar to existing conditions) and		=		-	N/A	-	N/A	-		-		-
no change in depth zones												
Capping that leads to a conversion of deep water to shallow water												
depth zones and results in a significant change in substrate type (i.e.,	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
from silt/sand/ gravel to large rock) ⁿ												
Capping that leads to a conversion of deep water to shallow water												
depths and does not result in a significant change in substrate type	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
(i.e., from silt/sand/gravel to large rock) ⁿ												
Shoreline Integration ^b												
Shoreline integration resulting in hardening of the shoreline (i.e.,												
placement of large rock)	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Shoreline integration resulting in softening of the shoreline	N/A	_	N/A	_	N/A	-	N/A	_	N/A	-	N/A	-
Shoreline integration that does not result in a change in the shoreline												
condition	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Enhanced Monitored Natural Recovery (includes in situ treatment)			•									
Placement of sand/gravel or smaller substrate for monitored natural												
recovery		-				-						
Over-water and In-water Structures												
Removal of over-water structures that causes aquatic shading	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Replacement of over-water structures in a way that reduces the												
amount of aquatic shading by allowing light to penetrate underneath	N/A	_	N/A	_	N/A	_	N/A		N/A	_	N/A	
the structure and that is expected to improve habitat function	14/11		11/11		14/11		TV/FI		TV/FI		14/71	
Removal of existing piles that provide habitat to predators of juvenile	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
salmonids												

Table 1. Draft LWG Mitigation Framework ^a - Main C

					M	ain Chann	el Shallow Wat	er				
	Gravel and finer substrates 0 to 10 ft water from OLW		Gravel and finer substrates 10 to 20 ft water from OLW		Natural rock outcrop (can not be created) 0 to 10 ft water from OLW		Natural rock outcrop (can not be created) 10 to 20 ft water from OLW		Moderate substrate size (rounded rock larger than sand/gravel but smaller than riprap) 0 to 10 ft water from OLW		Moderate substrate size (rounded rock larger than sand/gravel but smaller than riprap) 10 to 20 ft water from OLW	
Remedial Technologies	$(0.8 - 1)^{q}$	Note ID	$(0.4)^{q}$	Note ID	(0.8 - 1)	Note ID	(0.3)	Note ID	$(0.4 - 0.6)^{q}$	Note ID	$(0.2)^{q}$	Note ID
Confined Disposal Facility Construction/Confined Aquatic Disposal												
Filling that leads to a conversion of deep water to shallower water depth zones and results in a significant change in substrate type (i.e., from silt/sand/ gravel to large rock) ⁿ	N/A		N/A	-	N/A	-	N/A	-	N/A		N/A	-
Filling that leads to a conversion of deep water to shallow water depths and does not result in a significant change in substrate type (i.e., from silt/sand/gravel to large rock) ⁿ	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Filling aquatic habitat that results in a conversion to upland habitat		-				-						

LWG Lower Willamette Group

Table 1. Draft LWG Mitigation Framework ^a - Main Channel														
			M	ain Channe	l Shallow Wate	r (contin					M	ain Channe	el Deep Wat	er
							Snallow		Snallow					1
							water with		water with					1
			G1 11		G1 11		covering		covering					1
			Shallow water		Shallow water		structures		structures					1
			with riprap,		with riprap,		(docks)		(docks)					1
			concrete or		concrete or		0 to 10 ft		10 to 20 ft					1
			other artificial		other artificial		water from		water from					1
			debris		debris		OLW		OLW					1
	Pilings (1 per 100		0 to 10 ft		10 to 20 ft		(1/2 value		(1/2 value					1
	sq ft) (1/2 value		water from		water from		of the		of the		Natural		Artificial	1
	of main channel		OLW		OLW		channel		channel		substrates		substrates	1
Remedial Technologies	type)	Note ID	(0.1 - 0.5)	Note ID	(0.1)	Note ID	type)	Note ID	type)	Note ID	(0.1)	Note ID	(0.05)	Note ID
Dredging	•	ī	•	ī	•	1	•		1					
Dredging resulting in a habitat type conversion to deep water		e		-		-	ļ	-		-	N/A	-	N/A	-
Dredging <u>not</u> resulting in a habitat type conversion (may include		_		-		-		-		-		=		-
capping back over the dredge area with similar substrate type)														
Capping	T	ı		ı			1		1		1 1		ı	
Capping resulting in a <u>significant</u> change in substrate type (i.e., from		e		_		_		_		_		_		1 -
silt/sand/gravel to large rock) but no change in depth zones ⁿ		, and the second												
Capping resulting in a moderate change in substrate type (i.e., from														1
silt/sand/gravel to cobble or material size larger than gravel but		e, k		-		-		d		d		-		-
smaller than riprap) but no change in depth zones ⁿ														1
Capping that does not result in a significant change in the substrate														
type (i.e., substrate size remains similar to existing conditions) and		-		-		-		-		-		=		-
no change in depth zones														1
Capping that leads to a conversion of deep water to shallow water														
depth zones and results in a significant change in substrate type (i.e.,	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-		_		-
from silt/sand/ gravel to large rock) ⁿ														1
Capping that leads to a conversion of deep water to shallow water														
depths and <u>does not</u> result in a significant change in substrate type	N/A	-	N/A	_	N/A	_	N/A	_	N/A	_		_		-
(i.e., from silt/sand/gravel to large rock) ⁿ	14/11		14/11		14/11		14/21		14/21					1
Shoreline Integration ^b														
,										_				
Shoreline integration resulting in hardening of the shoreline (i.e., placement of large rock)	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Shoreline integration resulting in softening of the shoreline	N/A	_	N/A	_	N/A	_	N/A	_	N/A	_	N/A	_	N/A	_
Shoreline integration that does not result in a change in the shoreline														
condition	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Enhanced Monitored Natural Recovery (includes in situ treatment)														
Placement of sand/gravel or smaller substrate for monitored natural														
recovery	0	-		-				-		-		-		1 -
Over-water and In-water Structures	•		•		•						<u> </u>		<u>.</u>	
Removal of over-water structures that causes aquatic shading	N/A	-	N/A	-	N/A	-		e		e	N/A	-	N/A	
Replacement of over-water structures in a way that reduces the														
amount of aquatic shading by allowing light to penetrate underneath	N/A		N/A		N/A						N/A		N/A	
the structure and that is expected to improve habitat function	IN/A	-	IN/A	-	IN/A	-		=		-	N/A	_	N/A	
·														
Removal of existing piles that provide habitat to predators of juvenile		e	N/A	-	N/A	_	N/A		N/A		N/A		N/A	-
salmonids			14/11		IVA		1 1/11		11/11		1 1/11		14/11	

Table 1. Draft LWG Mitigation Framework^a - Main Channel

-			Ma	ain Channe	l Shallow Water	(contin	ued)				M	Iain Channe	el Deep Wate	er
						(Snallow		Snallow					
							water with		water with					
							covering		covering					
			Shallow water		Shallow water		structures		structures					
			with riprap,		with riprap,		(docks)		(docks)					
			concrete or		concrete or		0 to 10 ft		10 to 20 ft					
			other artificial		other artificial		water from		water from					
			debris		debris		OLW		OLW					
	Pilings (1 per 100		0 to 10 ft		10 to 20 ft		(1/2 value		(1/2 value					
	sq ft) (1/2 value		water from		water from		of the		of the		Natural		Artificial	
	of main channel		OLW		OLW		channel		channel		substrates		substrates	
D 11.17 1 1 1		Note ID		Note ID		Moto ID		Note ID		Note ID		Note ID		Note ID
Remedial Technologies	type)	Note ID	(0.1 - 0.5)	Note ID	(0.1)	Note ID	type)	Note ID	type)	Note ID	(0.1)	Note ID	(0.05)	Note ID
Confined Disposal Facility Construction/Confined Aquatic Disposal	<u> </u>													
Filling that leads to a conversion of deep water to shallower water														
depth zones and results in a significant change in substrate type (i.e.,	N/A	_	N/A	_	N/A	_	N/A	_	N/A	_		_		-
from silt/sand/ gravel to large rock) ⁿ														
Filling that leads to a conversion of deep water to shallow water														
depths and does not result in a significant change in substrate type	N/A	_	N/A	_	N/A	_	N/A	_	N/A	_		_		-
(i.e., from silt/sand/gravel to large rock) ⁿ														
Filling aquatic habitat that results in a conversion to upland habitat														
		-		-				-				=		-

Notes:

- a This matrix is focused on long-term habitat impacts rather than short-term construction related impacts. The short-term construction related impacts would be dealt with using BMPs that could potentially be employed, and would not require habitat mitigation.
- b Shoreline Integration = To successfully integrate a new cap or dredge slope into the shoreline, the shoreline may need to be altered; the need for dredging and capping in the river may result in the need for integration into the higher shoreline for removal or capping of contaminants in the lower shoreline.
- d It is assumed that the existing habitat condition will not be further improved or degraded if left in place regardless of the proposed remedial activity. For example, sheetpile and riprap in the active channel margin have a habitat value of 0. The proposed habitat value will remain 0 regardless of what remedial activity is proposed.
- e Existing or proposed habitat values depend on the habitat characteristics where the piling or covering structures are or will be located.
- f Value could change depending on the type of hardening that occurs. For this table, we assumed the slope would be riprapped.
- g Value could change depending on proposed type of softening. For this table we assumed a slope < 5:1 with vegetation and no armoring.
- h No existing values are found in the NMFS Expert Panel Table of Relative Chinook Salmon Lower Willamette Habitat Values for hardening off-channel habitats, so the values from the active channel margin were used (i.e., riprap = 0.1)
- i It is assumed that the riprap and covering structures habitat will not be further improved or degraded by placing piling.
- k NMFS Expert Panel provided a value of 0.1 for riprap in the shallow water main channel areas. Proposing to add a value of ranging from 0.4 to 0.6 for material sized larger than gravel, but smaller than riprap.
- n Sand/silt/gravel = material less than 64 mm in size
- o This scenario did not have a value in the Expert Panel table.
- p Value will vary depending on what the naturally vegetated habitat types will be hardened to (i.e., vegetated riprap or riprap) or on what the degraded habitat types are softened to.
- q sand/gravel material overlying riprap (may need monitoring to confirm it remains in place) gets same values; Riprap with smaller material layered on top, or placed in such a way as to promote natural deposition of sediment would provide habitat value similar to those for the given main channel category

General Note - For the purposes of the FS, it is assumed that mitigation projects would be implemented within 2 years of the remedial activity and that it would take the habitat 1 year to reach full function.

LWG Lower Willamette Group

Table 1. Draft LWG Mitigation Framework ^a - Off-channel Habitat	_																											
		1		1	1			T		1	T	T			Off-channel		1	T					1	T	1			
																					Covered							
																					structures over off-							
																					channel		Riprap,					
					Alcove or		Embaymen		Alcove or						Alcove or		Embayment				areas		concrete or					
	"Cold"				slough with		t (cove)		slough with		Embayment		"Warm"		slough		(cove) without				(docks)(1/2		other				Pilings (1 per	
	water				"cold"		with "cold"		"warm"		(cove) with		water		without		tributary (0.8)				value of the		artificial				100 sq ft) (1/2	
	tributary		Side		tributary		tributary		tributary		"warm"		tributary		tributary		(0.6 if		Bioengineered		channel		debris (0.1-		Sheetpile		value of off-	
Remedial Technologies	(1)	Note ID	channel (1)	Note ID	(1)	Note ID	(1)	Note ID	(.9)	Note ID	tributary (.9)	Note ID	(0.9)	Note ID	(0.8)	Note ID	upstream)	Note ID	(0.2-0.8)	Note ID	type)	Note ID	0.3)	Note ID	(0)	Note ID	channel type)	Note ID
Dredging	•	•	•					•	•				•	•				•	•					•		•		
Dredging resulting in a habitat type conversion to deep water		-		-		-		-		-		-		-		-		-		-		-		d		d		e
Dredging not resulting in a habitat type conversion (may include																												
capping back over the dredge area with similar substrate type)		_		-		-		-		-		-		-		-		-		-		1		-		=		_
Capping																												
Capping resulting in a significant change in substrate type (i.e., from																												
silt/sand/gravel to large rock) but no change in depth zones ⁿ		_		-		-		-		=		-		-		-		-		_		-		-		=		e
Capping resulting in a moderate change in substrate type (i.e., from																												
silt/sand/gravel to cobble or material size larger than gravel but smaller		k		k		k		k		k		k		k		k		k		d		d		-		d		e
than riprap) but no change in depth zones ⁿ																												
Capping that does not result in a significant change in the substrate type)																											
(i.e., substrate size remains similar to existing conditions) and no		-		-		-		-		-		-		-		-		-		-		-		-		-		-
change in depth zones																												
Capping that leads to a conversion of deep water to shallow water depth	1																											
zones and results in a significant change in substrate type (i.e., from	N/A	-	N/A	-	N/A	-	N/A	-	N/A		N/A	-	N/A	-	N/A	-	N/A	-	N/A		N/A	-	N/A	-	N/A	-	N/A	-
silt/sand/ gravel to large rock) ⁿ																												
Capping that leads to a conversion of deep water to shallow water																												
depths and does not result in a significant change in substrate type (i.e.,	N/A	-	N/A	-	N/A	-	N/A	-	N/A		N/A	-	N/A	-	N/A	-	N/A	-	N/A		N/A	-	N/A	-	N/A	-	N/A	-
from silt/sand/gravel to large rock) ⁿ																												
Shoreline Integration ^b																												
Shoreline integration resulting in hardening of the shoreline (i.e.,		1 6		1 6		1 6		1 6		1 0		1 6		1 0		1 6		1 6		1 6		1 6		1 6		1		e
placement of large rock)		h, f		h, f		h, f		h, f		h, f		h, f		h, f		h, f		h, f		h, f		h, f		h, f		d		
Shoreline integration resulting in softening of the shoreline	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-		g		-		g		g		e
Shoreline integration that does not result in a change in the shoreline		_		_		_		_		_		_		_		_		_				_		_		_		_
condition				_		_		_		_		_		_				_		_		_		_		_		
Enhanced Monitored Natural Recovery (includes in situ treatment)		_		r	T		T	T	1	T	T	T			•	•	1	T	1		T		•	T	•			_
Placement of sand/gravel or smaller substrate for monitored natural		_		_		_		_		_		_		_		_		_		_		_		_		_		_
recovery																												
Over-water and In-water Structures	77/1				27/1		27/1		77/1		27/1		27/1		27/				27/1		1		27/1		27/1		27/1	
Removal of over-water structures that causes aquatic shading	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-		e	N/A	-	N/A	-	N/A	-
Replacement of over-water structures in a way that reduces the amount																												
of aquatic shading by allowing light to penetrate underneath the	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	- 1		-	N/A	-	N/A	-	N/A	
structure and that is expected to improve habitat function																												
Removal of existing piles that provide habitat to predators of juvenile																												
salmonids	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-			N/A	-	N/A	-	N/A	-		e
samonus																												I

June 21, 2010

Lower Willamette Group

Table 1. Draft LWG Mitigation Framework^a - Off-channel Habitat Off-channel

														U	n-channei												
																				Covered							
																				structures							
																				over off-							
																				channel		Riprap,					
					Alcove or		Embaymen		Alcove or						Alcove or	Emb	ayment			areas		concrete or					
	"Cold"				slough with		t (cove)		slough with		Embayment		"Warm"		slough	(cove) without			(docks)(1/2		other				Pilings (1 per	
	water				"cold"		with "cold"		"warm"		(cove) with		water		without	tribut	ary (0.8)			value of the	:	artificial				100 sq ft) (1/2	
	tributary		Side		tributary		tributary		tributary		"warm"		tributary		tributary	(().6 if	Bioengine	red	channel		debris (0.1-		Sheetpile		value of off-	
Remedial Technologies	(1)	Note ID	channel (1)	Note ID	(1)	Note ID	(1)	Note ID	(.9)	Note ID	tributary (.9)	Note ID	(0.9)	Note ID	(0.8)	Note ID ups	tream) N	ote ID (0.2-0.8	Note II	type)	Note ID	0.3)	Note ID	(0)	Note ID	channel type)	Note ID
Confined Disposal Facility Construction/Confined Aquatic Disposal																											
Confined Disposal Facility Construction/Confined Aquatic Disposal Filling that leads to a conversion of deep water to shallower water depth	n e																										
	n N/A	-	N/A	_	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-]	N/A	- N/A	_	N/A	-	N/A	-	N/A	-	N/A	-
Filling that leads to a conversion of deep water to shallower water depth		-	N/A	-	N/A	-	N/A	-]	N/A	- N/A	-	N/A	-	N/A	-	N/A	-	N/A	-								
Filling that leads to a conversion of deep water to shallower water depth zones and results in a significant change in substrate type (i.e., from	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	-	N/A	- 1	N/A	- N/A	-	N/A	-	N/A	-	N/A	-	N/A	-
Filling that leads to a conversion of deep water to shallower water depth zones and results in a significant change in substrate type (i.e., from silt/sand/ gravel to large rock) ⁿ	N/A	-	N/A	-	N/A	-	N/A	-	N/A N/A	-	N/A	-	N/A	-	N/A N/A		N/A N/A	- N/A	-	N/A N/A	-	N/A N/A	-	N/A N/A	-	N/A N/A	-
Filling that leads to a conversion of deep water to shallower water depth zones and results in a significant change in substrate type (i.e., from silt/sand/ gravel to large rock) ⁿ Filling that leads to a conversion of deep water to shallow water depths	N/A	-		-		-		-				-		-	-				-		-		-		-		-
Filling that leads to a conversion of deep water to shallower water depth zones and results in a significant change in substrate type (i.e., from silt/sand/ gravel to large rock) ⁿ Filling that leads to a conversion of deep water to shallow water depths and does not result in a significant change in substrate type (i.e., from	N/A	-		-		-		-				-		-	-				-		-		-		-		-

Notes:

- a This matrix is focused on long-term habitat impacts rather than short-term construction related impacts. The short-term construction related impacts would be dealt with using BMPs that could potentially be employed, and would not require habitat mitigation.
- b Shoreline Integration = To successfully integrate a new cap or dredge slope into the shoreline may need to be altered; the need for dredging and capping in the river may result in the need for integration into the higher shoreline for removal or capping of contaminants in the lower shoreline.
- d It is assumed that the existing habitat condition will not be further improved or degraded if left in place regardless of the proposed remedial activity. For example, sheetpile and riprap in the active channel margin have a habitat value of 0.
- The proposed habitat value will remain 0 regardless of what remedial activity is proposed.
- e Existing or proposed habitat values depend on the habitat characteristics where the piling or covering structures are or will be located.
- f Value could change depending on the type of hardening that occurs. For this table, we assumed the slope would be riprapped.
- g Value could change depending on proposed type of softening. For this table we assumed a slope < 5:1 with vegetation and no armoring.
- h No existing values are found in the NMFS Expert Panel Table of Relative Chinook Salmon Lower Willamette Habitat Values for hardening off-channel habitats, so the values from the active channel margin were used (i.e., riprap = 0.0)
- i It is assumed that the riprap and covering structures habitat will not be further improved or degraded by placing piling.
- k NMFS Expert Panel provided a value of 0.1 for riprap in the shallow water main channel areas. Proposing to add a value of ranging from 0.4 to 0.6 for material sized larger than gravel, but smaller than riprap.
- n Sand/silt/gravel = material less than 64 mm in size
- o This scenario did not have a value in the Expert Panel table. As such, a value of 0.6 is proposed for this scenario.
- p Value will vary depending on what the naturally vegetated habitat types will be hardened to (i.e., vegetated riprap or riprap) or on what the degraded habitat types are softened to.

General Note - For the purposes of the FS, it is assumed that mitigation projects would be implemented within 2 years of the remedial activity and that the mitigation project would create off-channel habitat, which would take 1 year to reach full function.

Table 1. Draft LWG Mitigation Framework^a - Riparian Habitat Riparian

	Naturally vegetated forest, <400 ft from ACM and in historic	Note	Naturally vegetated forest, <400 ft from ACM	Note	Naturally vegetated, grass/shrub and associated with historic flood plain	Note	Naturally vegetated, grass/shrub	Note	Invasive species (0.1	Note	Vegetated Riprap		Unvegetated/paved/bu	
Remedial Technologies	floodplain (0.65)	ID	(0.5)	ID	(0.35)	ID	(0.2)	ID	- 0.3)	ID	(0.05 - 0.5)	ID	ildings/riprap (0)	Note ID
Dredging	1													
Dredging resulting in a habitat type conversion to deep water	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dredging <u>not</u> resulting in a habitat type conversion (may include	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
capping back over the dredge area with similar substrate type)														
Capping														
Capping resulting in a significant change in substrate type (i.e., from	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
silt/sand/gravel to large rock) but no change in depth zones ⁿ														
Capping resulting in a <u>moderate</u> change in substrate type (i.e., from														
silt/sand/gravel to cobble or material size larger than gravel but smaller	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
than riprap) but no change in depth zones ⁿ														
Capping that does not result in a significant change in the substrate														
type (i.e., substrate size remains similar to existing conditions) and no	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
change in depth zones														
Capping that leads to a conversion of deep water to shallow water														
depth zones and results in a significant change in substrate type (i.e.,	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
from silt/sand/ gravel to large rock) ⁿ														
Capping that leads to a conversion of deep water to shallow water														
depths and does not result in a significant change in substrate type	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(i.e., from silt/sand/gravel to large rock) ⁿ														
Shoreline Integration ^b	<u>-</u>			-			-	-						
Shoreline integration resulting in hardening of the shoreline (i.e.,														
placement of large rock)		p		p		p		p		p		-		-
Shoreline integration resulting in softening of the shoreline	N/A	-	N/A	-	N/A	-	N/A	-		р		р		р
Shoreline integration that does not result in a change in the shoreline												•		
condition		-		-		-		-		-		-		-
Enhanced Monitored Natural Recovery (includes in situ treatment)														
Placement of sand/gravel or smaller substrate for monitored natural	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
recovery	IV/A	IN/A	N/A	1 \ / <i>A</i>	IN/A	1 \ / <i>A</i>	IV/A	IN/A	IN/A	IN/A	N/A	IV/A	IV/A	1 \ / /A
Over-water and In-water Structures														
Removal of over-water structures that causes aquatic shading	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Replacement of over-water structures in a way that reduces the amount														
of aquatic shading by allowing light to penetrate underneath the structure and that is expected to improve habitat function	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal of existing piles that provide habitat to predators of juvenile salmonids	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lower Willamette Group

Table 1. Draft LWG Mitigation Framework ^a - Riparian Habitat														
							Ripar	ian						
	Naturally vegetated forest, <400 ft from ACM and in		Naturally vegetated forest, <400 ft		Naturally vegetated, grass/shrub and associated with historic		Naturally vegetated,		Invasive		Vegetated			
	historic	Note	from ACM	Note	flood plain	Note	grass/shrub		species (0.1	Note	Riprap		Unvegetated/paved/bu	
Remedial Technologies	floodplain (0.65)	ID	(0.5)	ID	(0.35)	ID	(0.2)	ID	- 0.3)	ID	(0.05 - 0.5)	ID	ildings/riprap (0)	Note ID
Confined Disposal Facility Construction/Confined Aquatic Disposal														
Filling that leads to a conversion of deep water to shallower water depth														
zones and results in a significant change in substrate type (i.e., from	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
silt/sand/ gravel to large rock) ⁿ														
Filling that leads to a conversion of deep water to shallow water depths														
and does not result in a significant change in substrate type (i.e., from	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
silt/sand/gravel to large rock) ⁿ														
Filling aquatic habitat that results in a conversion to upland habitat	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

- a This matrix is focused on long-term habitat impacts rather than short-term construction related impacts. The short-term construction related impacts would be dealt with using BMPs that could potentially be employed, and would not require habitat mitigation.
- b Shoreline Integration = To successfully integrate a new cap or dredge slope into the shoreline may need to be altered; the need for dredging and capping in the river may result in the need for integration into the higher shoreline for removal or capping of contaminants in the lower shoreline.
- d It is assumed that the existing habitat condition will not be further improved or degraded if left in place regardless of the proposed remedial activity. For example, sheetpile and riprap in the active channel margin have a habitat value of 0. The proposed habitat value will remain 0 regardless of what remedial activity is proposed.
- e Existing or proposed habitat values depend on the habitat characteristics where the piling or covering structures are or will be located.
- f Value could change depending on the type of hardening that occurs. For this table, we assumed the slope would be riprapped.
- g Value could change depending on proposed type of softening. For this table we assumed a slope < 5:1 with vegetation and no armoring.
- h No existing values are found in the NMFS Expert Panel Table of Relative Chinook Salmon Lower Willamette Habitat Values for hardening off-channel habitats, so the values from the active channel margin were used (i.e., riprap = 0.1)
- i It is assumed that the riprap and covering structures habitat will not be further improved or degraded by placing piling.
- k NMFS Expert Panel provided a value of 0.1 for riprap in the shallow water main channel areas. Proposing to add a value of ranging from 0.4 to 0.6 for material sized larger than gravel, but smaller than riprap.
- n Sand/silt/gravel = material less than 64 mm in size
- o This scenario did not have a value in the Expert Panel table.
- p Value will vary depending on what the naturally vegetated habitat types will be hardened to (i.e., vegetated riprap or riprap) or on what the degraded habitat types are softened to.

General Note - For the purposes of the FS, it is assumed that mitigation projects would be implemented within 2 years of the remedial activity and that the mitigation project would create off-channel habitat, which would take 1 year to reach full function.